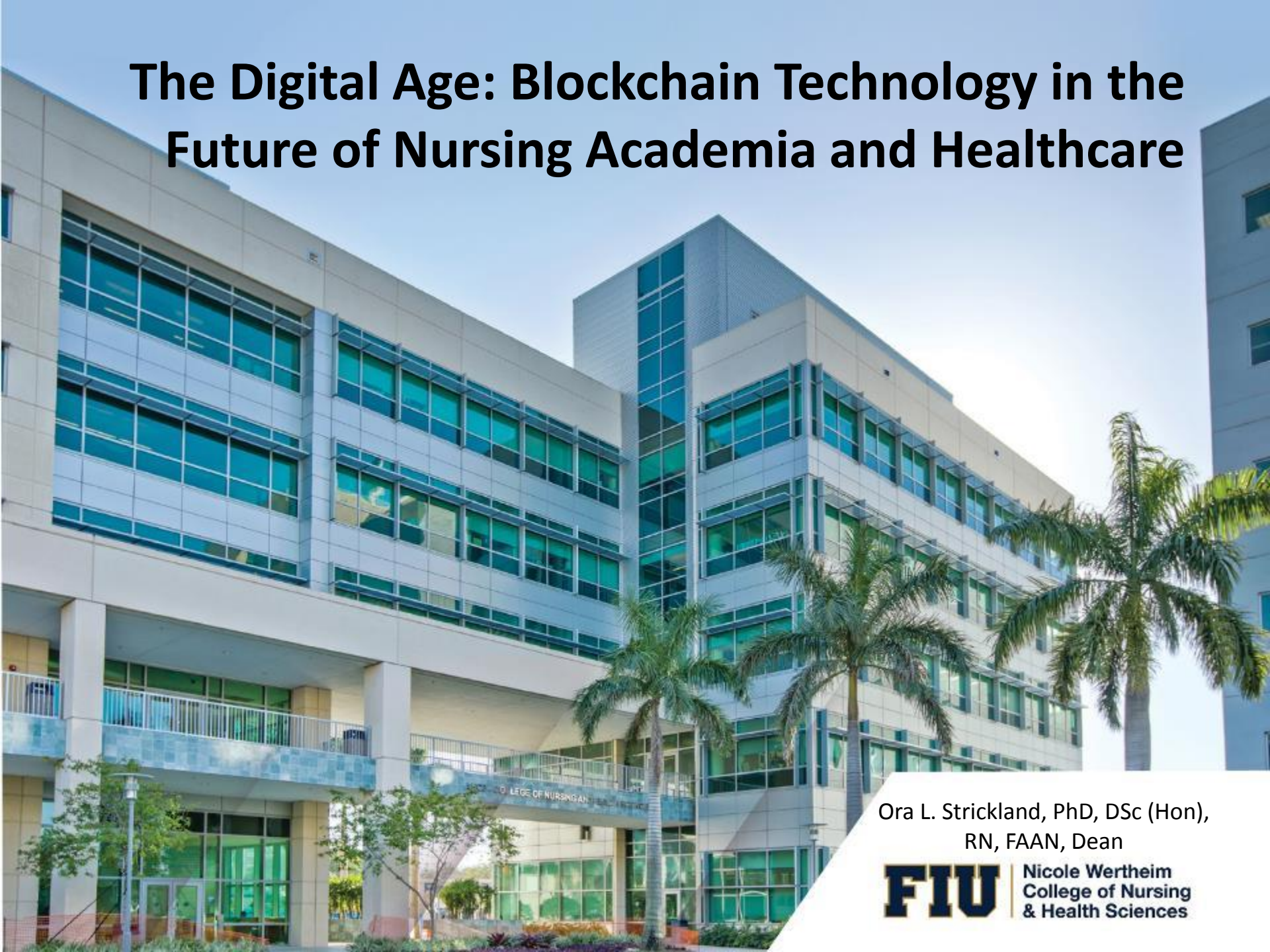


The Digital Age: Blockchain Technology in the Future of Nursing Academia and Healthcare



Ora L. Strickland, PhD, DSc (Hon),
RN, FAAN, Dean

FIU | Nicole Wertheim
College of Nursing
& Health Sciences

The Future is Now!

Welcome to the future.

The future is now!

the Digital Age has brought us

BLOCKCHAIN TECHNOLOGY!

Focus of Today's Presentation

We will:

Explore together the new reality of the next phase of the currently evolving Digital Age – Blockchain Technology.

Discuss the basics of blockchain technology, how it works, some of its current uses, its advantages, and disadvantages.

Explore how blockchain technology can enhance academia and healthcare; and, what might be required for us to fully participate in and take advantage of this technology.

What is Blockchain Technology?

A shared, immutable ledger – a digital technology that will forever change the world!

What is Blockchain Technology?

A means for recording and storing a shared or distributed ledger and its transactions, and tracking the movement of any asset on the ledger in a matter of seconds or minutes over a digital network.

Networks can be “unpermissioned” (open to anyone) or “permissioned” (restricted).

Assets can be tangible, intangible, or digital; e.g., a house, car, land, cash, patents, copyrights or intellectual property.

A blockchain is a digital operating system that provides for many applications that can run on that operating system. (Similar to internet operating systems, e.g. Microsoft Windows or MacOS.)

How Blockchain Works

- A blockchain stores data in blocks linked together to form a chain.
- As the number of digital transactions grows, the blockchain also grows.
- The time and sequence of transactions are recorded and confirmed in blocks, which are logged into the blockchain within a discrete network.
- This network is governed by rules agreed on by the network participants (Gupta, 2018).

Why is a Blockchain Immutable?

- Each block contains a digital fingerprint or unique identifier or *hash*.
- The previous block hash links blocks together and prevents any block from being altered or the insertion of another block between two existing blocks. This renders the blockchain tamper evident.
- The blockchain contains verified proof of transactions, and it removes the possibility of tampering by a malicious actor (Gupta, 2018).

Advantages of Blockchain Applications

Efficient: Transaction information is recorded once and is immediately available to all parties through a distributed network with each participant acting as a publisher and subscriber. (Peer-to-peer replication)

Cost-effective: Eliminates the need for intermediaries. (Cuts out third parties)

Reliable: Information is immutable after transacted and recorded on the digital ledger of the blockchain network. (Data unchangeable, fixed, permanent)

Secure and safe: Since the underlying transferred ledger can't be changed; a change can only be made via another transaction, and both transactions would be visible.

Finality: Ownership and completion of a transaction is documented on a single, shared ledger.

Types of Blockchain Technology

Cryptocurrency

- Digital Currency
- Virtual Currency
- Characterized by peer-to-peer exchange

Blockchain Businesses and Markets

- Provide services based on blockchain or distributed ledger technologies for tracking information for commerce or governmental activities.
- A private, permissioned network where identities are often known and without the need for cryptocurrencies.

Cryptocurrency

- Digital currency that have no central monetary authority.
- They are **shared ledgers** that can be used to record any transaction and track the movement of any asset internationally. The effectiveness and efficiency of this ledger is the basis of a cryptocurrency's value.
- They are “mined” on running computers by people and businesses around the world who use special software in a peer-to-peer computer network.
- Current Major Cryptocurrencies (Over 1000)
 - Bitcoin, Ethereum, Litecoin, XRP (Ripple)

The Evolution of Currency

- Currency and Monetary Exchange Over the Ages
 - Barter
 - Gold
 - Metal Coin
 - Paper Money
 - Plastic Card
 - Electronic Transfers of Money
 - Cryptocurrency
- Types of currency
 - Fiat Currency – National metal and paper currency
 - Alt Currency – Various cryptocurrencies

Cryptocurrency: Is It the Next Logical Step in the Evolution of Money?

Limitations of cash and fiat currency transactions:

- Useful in local transactions in small amounts.
- Prolonged time between transactions and settlement.
- Need for third-party validation of available funds except for cash transactions. (Inefficient and costly).
- Vetting credit card transactions are costly, time-consuming and include intermediary fees.
- Half of the world's population have no access to bank accounts.
- A central finance system, e.g. banks, add cost and risk of fraud, cyberattacks, and mistakes.

Cryptocurrency: Is It the Next Logical Step in the Evolution of Money?

Disadvantages of Cryptocurrency

- Lack of public understanding of the broad spectrum of use cases for cryptocurrencies.
- Volatility in value.
- Limited ability of the public to understand, value, access and manage cryptocurrencies.
- Virtual and cryptocurrencies pose risks as potential vehicles for money laundering, tax evasion, and fraud.
- Development of effective regulatory responses to virtual and cryptocurrencies are at an early stage as they operate on a global scale.

Types of Blockchain Technology

Blockchain Businesses:

- Business networks that use blockchain technology.
- Peer-to-peer replication: Each participant (called a node) on the network share a ledger that is updated in seconds each time a transaction is made.
- The blockchain business is economical and efficient since it eliminates duplication of effort and reduces the need for “middle men” or intermediaries.
- Transactions are verifiable, secure, and authenticated.
- Smart contracts are used to set rules that govern a business transaction. It is stored on the blockchain and automatically executed with each transaction.

Key Business Benefits

- Time savings and cost savings.
- Enhanced privacy of transactions.
- Tighter Security: A “permissioned” network protects network participants against tampering, fraud, and cybercrime. By using IDs and permissions, users can indicate which transaction details they want other network participants to view.
- Enhanced trust across the business network: Transactions are more auditable. Digitalization streamlines transfer ownership, enhances privacy, and provides cryptographic proof of a set of transactions since they are tamper proof.

The Future of Blockchain Technology in Nursing Academia and Healthcare

Healthcare and academia need more efficient, secure and cost-effective systems for managing:

- Medical and student records
- Preauthorizing payments
- Transfer of payments
- Settling insurance claims
- Recording and transmitting:
 - Patient data
 - Student data
 - Research data

Potential Use Cases for Blockchain in Academia and Healthcare

- Faster and more accurate huge data entry and verification.
- Publication and copyright verification, storage and tracking.
- Redefinition and transparency of data sharing between academic and healthcare institutions related to research, and student and patient records.

Potential Use Cases for Blockchain in Academia and Healthcare

- Ensuring privacy of sensitive student and patient data and information.
- Verification of insurance and claimant information reducing fraud.
- Using blockchain technology for cross border research, patient care, and education.
- Recording origin, processing, shipping and tracking of patient supplies across borders.

Determining How Blockchain Fits in Your Work

(Gupta, 2018, p. 41-40)

- Does my business network need to manage contractual relationships?
- Do we need to track transactions that involve more than two parties?
- Is the current system overly complex or costly, due to the need for intermediaries or a central point of control?
- Can the network benefit from increased trust, transparency, and accountability in recordkeeping?

Determining How Blockchain Fits in Your Work

(Gupta, 2018, p. 41-40)

- Is the current system prone to errors due to manual processes or duplication of effort?
- Is the current transaction system vulnerable to fraud, cyberattack, and human error?

A “yes” answer to any of these questions means blockchain can likely benefit your work.

Key Questions for Nursing and Academia to Consider

- Are we ready to become active participants in blockchain technology?
- Is the nursing profession adequately prepared to help transform our ecosystems utilizing blockchain technology?
- With what other disciplines should we collaborate to ensure our active participation in blockchain development?
- How should we adapt our curricula to ensure that nurses and educators actively and meaningfully engage with blockchain technology?

Final Word

“The blockchain technology, still in its early years, has thrown down the gauntlet in front of the current systems, challenging them to overhaul.”

Prableen Bajnai, 2016

Key References

Bajnai, P. (2016, Jan. 28). *News Headlines, Bitcoin. Software, Technology*. <http://www.Nasdaq.com/article/how-the-blockchain-is-being-used-beyond-bitcoin-and-finance/571563>. Downloaded, May 14, 2017.

Gupta, M.(2018). *Blockchain for Dummies (2nd IBM Limited Edition)*. Hoboken, NJ., John Wiley & Sons, Inc.

He.D., Habermeier, K., Leskow, R. et al. (2016, January). Virtual currencies and beyond: Initial considerations. *IMF Staff Team Discussion Note*, International Monetary Fund.